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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/664,105	09/19/2000	Robert W. Mason	LYON 0117 PUS	5382

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EXAMINER

OH, TAYLOR V

ART UNIT

PAPER NUMBER

1625

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/664,105

Applicant(s)

MASON, ROBERT W.

Examiner

Taylor Victor Oh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Applicant's arguments with respect to claims 26-52 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

Claims 26 ,37, 46 , 48, 50, and 52 are rejected under 35 U.S.C. 112, first paragraph,

because the specification, while being enabling for organic isocyanates, such as 2,4- and 2,6-toluene diisocyanate (TDI) , 4, 4'-diphenylmethane diisocyanate, 1,6-hexane diisocyanate, isophorone diisocyanate, and etc. , does not reasonably provide enablement for all the organic isocyanates in the field of organic chemistry. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to all the organic isocyanates unrelated to the current invention commensurate in scope with these claims. Therefore, an appropriate correction is required. Furthermore, there are "foreman factors or Wands factors" regarding the presence or absence of working examples because the preparation of organic isocyanates (see pages 12-15) has eight examples shown in the specification. The reaction conditions for producing organic isocyanates, such as reaction temperature and pressure, are not applicable to all the reaction conditions for all the organic isocyanates represented by the formulas in the claim 27. Thus, the specification has failed to provide sufficient working examples to support the broad spectrum of thousands of compounds represented in the formulas. In addition, more than routine experimentation is required and involved (second foremen factor).

See In re Armbruster 185 USPQ 204 (CCPA 1985) and Angstadt et al , 190 USPQ 152, (CCPA 1990).

Because the specification, while being enabling for an organic formamide compound, such as aliphatic and aryl formamides containing 1 to 10 formamide groups, does not reasonably provide enablement for all the organic formamide in the field of chemistry. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to all the organic formamide unrelated to the current invention commensurate in scope with these claims. Therefore, an appropriate correction is required.

Because the specification, while being enabling for a diorganocarbonate, such as dimethylcarbonate, diethylcarbonate, di(n-propyl) carbonate, di(n-hexyl)carbonate, di(2-ethylhexyl)carbonate, diphenylcarbonate, di(4-chlorophenyl) carbonate, does not reasonably provide enablement for all the diorganocarbonates in the field of chemistry. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to all the diorganocarbonates unrelated to the current invention commensurate in scope with these claims. Therefore, an appropriate correction is required.

Because the specification, while being enabling for an amine, such as aniline, 2-, 3-, and 4-methylaniline, 1,2-, 1,3-, and 1,4-phenylene diamine, 2,4-,2,6-, and 3,5-

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toluene diamine, 2,2'-, 2,4', 4,4'-diaminodiphenylmethane, diaminodiphenylsulfones, diaminodiphenyloxides, diaminodiphenylsulfides, does not reasonably provide enablement for all the amines in the field of organic chemistry. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to all the amines unrelated to the current invention commensurate in scope with these claims. Therefore, an appropriate correction is required.

Because the specification, while being enabling for a metal catalyst, such as transition metal, regular group metal salts, complexes, organometallic compounds, copper, tin, and zinc salts, does not reasonably provide enablement for all the metal catalysts in the field of organic chemistry. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to all the metal catalysts unrelated to the current invention commensurate in scope with these claims. Therefore, an appropriate correction is required. Furthermore, a metal catalyst may represent an unpredictable aspect in the art of organic chemistry. See *Exparte Sizto*, 9 USPQ2d 2081 (Bd. Of App. And Inter. March 1988).

Claims 26, 27, 28, 31, 33, 37, and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 26, a phrase "an elevated temperature" is written. However, this does not describe what the effective range of the elevated temperature is. An appropriate correction is required.

In claim 27, a phrase “ an organic radical” is written. However, “ an organic radical” is vague and indefinite. This does not explain what kind of the organic radical group is belonged to R in the formula. An appropriate correction is required.

In claim 28, “ R may contain one or more chain or ring heteroatoms” is written. However, this is vague and indefinite. This does not explain what one or more chain and ring heteroatoms are represented for the R group . An appropriate correction is required.

In claim 31, a phrase “ at a temperature wherein isocyanate is produced ” is written. However, this does not describe at what temperature the isocyanate is produced. An appropriate correction is required.

In claim 33, a phrase “ thermolyzing said isocyanate precursor mixture at a second higher temperature to obtain the isocyanate” is written. However, this does not describe at what second temperature the isocyanate is produced. An appropriate correction is required.

In claim 37, a phrase “ an effective carbamide-cleaving amount of a metal catalyst” is written. However, the term “ an effective amount” is indefinite where the claim fails to state the function which is to be rendered effective. An appropriate correction is required.

In claim 42, a phrase “ their heteroatoms substituted analogs, and mixtures thereof ” is written. However, this does not describe what their heteroatoms substituted analogs, and mixtures thereof are in the claim. An appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 26-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okawa (U.S. 5,166,414) in view of Kober et al (U.S. 3,366,662) in view of Faraj (U.S. 5,686,645).

Okawa discloses a process of producing an isocyanate compound from reacting either a formamide compound or an amine compound with dimethyl carbonate in the presence of an alkali catalyst, thereby obtaining a corresponding urethane at a temperature of 0-150⁰ C., and further converting the corresponding urethane by thermal decomposition at a temperature of 150-350⁰ C. (see col. 2 ,lines 59-63) to generate an isocyanate compound (see col. 2 ,lines 36-52). During the reaction process, the

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amount of dimethyl carbonate to be used is in the range of 1-20 moles per 1 mole of the formamide group of the formamide compound (see col. 5 , lines 13-17). In addition, the Okawa reference has pointed out that the prior art process makes it possible to produce aromatic diisocyanate compounds from aromatic diamine compounds (see col. 5 , lines 3-5).

However, the instant invention differs from the Okawa reference in that diorganocarbonate is diphenylcarbonate, an organic formamide compound is 2,4-bis(N-formamide) of toluene diamine, the reaction takes place in the absence of a catalyst in the phenol solvent, phenol formate ester is recycled to form an organic formamide, the organic formamide is recycled to the reaction mixture with an organic di- or polyamine.

Kober et al discloses a process of preparing isocyanates by reacting an organic carbonate, such as diphenyl carbonate with a diamine such as 5-chloro-2,4-tolylene diamine at a temperature of from 60⁰ to 250⁰ C. ; in addition, during the reaction process , phenol ,one of the by-products, is formed.

The Okawa reference does teach the process of obtaining the isocyanate compound from reacting either a formamide compound or an amine compound with an organic carbonate, such as dimethyl carbonate in the presence of an alkali catalyst, producing a corresponding urethane , and further thermally decomposing the urethane compound to obtain the desired compound whereas Kober et al do disclose the process of preparing isocyanates by reacting diphenyl carbonate with a diamine such as 5-chloro-2,4-tolylene diamine at a temperature of from 60⁰ to 250⁰ C. Their reaction processes share a common reaction mechanism with either dimethyl carbonate or

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diphenyl carbonate belonging to commonly known organic carbonates. Furthermore, The Okawa reference does indicate the equivalency between the use of formamide compound and the amine compound in the reaction process.

In reference to the organic formamide compound being 2,4-bis(N-formamide) of toluene diamine, the Examiner has noted applicant's argument. However, according to the Faraj reference, this compound is well-known to be used as a reactant (see col. 3, line 11) in the synthesis of isocyanate precursors; in addition, carbamates may be cracked to generate isocyanates (see col. 1, lines 10-13).

With respect to the reaction process in the absence of a catalyst, the Examiner has noted applicant's argument. However, the presence or the absence of the catalyst in the reaction process determines the rate of the reaction, not necessarily is connected to the novelty of the current invention unless there is an unexpected result happened in the case of the absence of the catalyst during the reaction process. Therefore, the absence of the catalyst does not have any patentable weight over the prior art reference.

Concerning phenol formate ester recycled to form an organic formamide and the organic formamide recycled to the reaction mixture with an organic di- or polyamine, the Examiner has noted applicant's argument. However, this step is directly related to the optimization of the process, thereby increasing the efficiency of the process and decreasing the cost of the operation. Therefore, if the skillful artisan in the art had desired to produce the isocyanate compound efficiently, it would have been obvious for the skillful artisan in the art to have recycled phenol formate ester to form the organic

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formamide and the organic formamide to the reaction mixture with the organic di- or polyamine in the combined Okawa's process and Kober et al's process.

Okawa expressly discloses the process of producing an isocyanate compound from reacting either a formamide compound or an amine compound with dimethyl carbonate in the presence of an alkali catalyst, thereby obtaining a corresponding urethane, and further converting the corresponding urethane by thermal decomposition to generate an isocyanate compound. Kober et al does disclose the process of preparing isocyanates by reacting an organic carbonate with a diamine. The Faraj reference does disclose that 2,4-bis(N-formamide) of toluene diamine is well-known to be used as a reactant in the synthesis of isocyanate precursors.

Okawa and Kober et al have shared the common process for producing an isocyanate compound in a similar way. Furthermore, the Okawa reference has pointed out that there is an equivalency with respect to the reaction mechanism of both processes regardless of using any organic carbonate with any diamine since it is possible to produce aromatic diisocyanate compounds from aromatic diamine compounds. Therefore, it would have been obvious for the skillful artisan in the art to have motivated to incorporate Faraj's 2,4-bis(N-formamide) of toluene diamine and Kober et al's diphenyl carbonate into the Okawa's process, thereby obtaining the desired product with an expectation of success as disclosed in the Okawa reference.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to T. Victor Oh whose telephone number is (703) 305-

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0809. The examiner can normally be reached on Monday through Friday from 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alan Rotman, can be reached on (703) 308-4698. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-4556.

Aug 20h
11/2/02

Al-Ch
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GROUP 1200